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Relaxation function theory of dynamic spin susceptibility in layered copper oxides: Implications for neutron resonance peak and ωT scaling

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Abstract

Using the Mori-Zwanzig projection operator procedure, the relaxation function theory with a three pole approximation is presented for a doped two-dimensional S=12 Heisenberg antiferromagnetic (AF) system in the paramagnetic state. The role of AF short range order, its evolution with doping and temperature, is highlighted in view of the magnetic response of high-Tc layered cuprates spanning in frequency from neutron scattering down to magnetic resonance experiments. It is shown that the spin-wavelike theory is able to reproduce the main features of dynamic spin susceptibility in the high-Tc cuprates as observed experimentally.

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